

AMSAT News Service Weekly Bulletins

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AMSAT NEWS SERVICE

ANS-265

The AMSAT News Service bulletins are a free, weekly news and information service of AMSAT North America, The Radio Amateur Satellite Corporation. ANS publishes news related to Amateur Radio in Space including reports on the activities of a worldwide group of Amateur Radio operators who share an active interest in designing, building, launching and communicating through analog and digital Amateur Radio satellites.

The news feed on <http://www.amsat.org> publishes news of Amateur Radio in Space as soon as our volunteers can post it.

Please send any amateur satellite news or reports to:
ans-editor at amsat.org.

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SB SAT @ AMSAT \$ANS-265.01

ANS-265 AMSAT News Service Weekly Bulletins

AMSAT News Service Bulletin 265.01

From AMSAT HQ SILVER SPRING, MD.

September 22, 2013

To All RADIO AMATEURS

BID: \$ANS-265.01

2013 AMSAT-NA Board of Directors Election Results Announced

As a result of the 2013 Board of Directors Election, Barry Baines, WD4ASW; Tony Monteiro, AA2TX, Alan Biddle, WA4SCA, and Mark Hammond, N8MH, will serve on the board for two years. The first alternate is JoAnne Maenpaa, K9JKM, and the second alternate is Steve Coy, K8UD. The results of the voting with 688 ballots cast are as follows;

Barry Baines, WD4ASW	521	
Tony Monteiro, AA2TX	518	
Alan Biddle, WA4SCA	424	
Mark Hammond, N8MH	365	
JoAnne Maenpaa, K9JK	316	
Steve Coy, K8UD		186
Frank Griffin, K4FEG	158	
Bryan Klofas, KF6ZE0	141	

[ANS thanks Martha at the AMSAT Office for the above information]

Final Call for Papers for the 2013 AMSAT Annual Meeting and Space Symposium

This is the final call for papers for the 2013 AMSAT Annual Meeting and Space Symposium to be held on the weekend of November 1 - 3, 2013, at the Marriott Hobby Airport Hotel, Houston, Texas. Proposals for papers, symposium presentations and poster presentations are invited on any topic of interest to the amateur satellite community. We request a tentative title of your presentation as soon as possible, with final copy to be submitted by October 5 for inclusion in the printed proceedings. Abstracts and papers should be sent to Dan Schultz at [n8fgv\(a\)amsat.org](mailto:n8fgv@amsat.org)

[ANS thanks Dan Schultz, N8FGV, for the above announcement]

NASA Internship Opportunities for Spring 2014

The NASA One Stop Shopping Initiative, or OSSSI, strives to provide students at all institutions of higher education access to a portfolio of internship, fellowship and scholarship opportunities offered by NASA mission directorates and centers.

Visit the Office of Education Infrastructure Division LaunchPad to find information on internship, fellowship and scholarship opportunities. The site features the OSSSI online application for recruiting NASA Interns, Fellows and Scholars, or NIFS. This innovative system allows students to search and apply for all types of higher-education NASA internship, fellowship and scholarship opportunities in one location. A single application places the student in the applicant pool for consideration by all NASA mentors.

Applications for spring 2014 opportunities are due Oct. 11, 2013.

To find available opportunities and to fill out an OSSSI online application for recruiting NIFS, visit <https://intern.nasa.gov>.

Inquiries about the OSSSI should be submitted via <https://intern.nasa.gov/oic/>.

[ANS thanks NASA Education Express Message -- Sept. 19, 2013 for the above information]

PSK-31 Transponder Needed for Launch Opportunity

On the AMSAT Bulletin Board (AMSAT-BB) Bob Bruninga WB4APR writes:

If someone will build a linear PSK-31 transponder, I have a launch opportunity in 9 months.

All it needs to be is a PSK-31 Linear receiver on 28.120 MHz (3 kHz bandwidth) with AGC coupled to a downlink UHF FM transmitter of about 1 Watt. Should fit on a 3.5? square card. This is the same as Brno University of Technology has built for prior missions of PCSAT2 on the ISS back in 2006 and the two on the shelf awaiting flights.

Flight delivery by May 2014 (9 months from now).

Brno University, may not have the people to make a third one for this new flight opportunity.

Just a thought for someone looking for a project.

PSK-31 Transponder Concept
<http://www.usna.edu/Users/aero/bruninga/psk31uplink.html>

[ANS thanks AMSAT-BB, AMSAT-UK, and Bob Bruninga, WB4APR for the above information]

Dutch Amateur Radio Satellite User Day – September 28, 2013

On Saturday, September 28, 2013 the very first Amateur Radio Satellite User Day will be held.

Location:

The event will take place at restaurant "Binnenhof", in the small town of Paasloo, in the North of the Netherlands, a 90 minute drive by car from Amsterdam.

Join us!

We invite everyone to come over and join us! For both newbies as well as experienced satellite operators it will be an exciting day with interesting presentations as well as exciting activities!

Two Dutch satellite builders will talk about their latest satellites, that both will be launched in November: FUNCube-1 (Wouter Weggelaar – PA3WEG) and Delfi-n3Xt (Jasper Bouwmeester). Both projects will take along with them engineering models: a great opportunity to see yourself how small and advanced Cubesats look like!

Furthermore we have many hands-on sessions planned: take your own radio and antenna to Paasloo, we can help you get started or you can compare yours to that of the others!

Of course this is a fantastic opportunity to 'meet and great' each other in person. The OSCAR lunch has a lot of time reserved for that as well. The entire day is free of charge, including coffee and lunch. From those that want to stay for the Barbecue at the end of the day we ask a contribution of 17,50 euro.

For those that cannot come over to the Netherlands: meet us during one of the on-air hands-on sessions (see the program details below).

Program

10:00 Arrival
Coffee and tea, registration

10:30 – 10:45 Hands-on session VO-52
Listen to, and maybe even make a QSO via, the strongest linear transponder currently in space. We do have a low elevation pass, need to check line-of-sight. 2m/70cm SSB transponder, maximum elevation 11 degrees

10:45 – 11:00 Welcome
Opening of both the "VHF-day" and the "Amateur Radio Satellite User Day"

10:43 – 11:02 Hands-on session HO-68
Listening to the CW downlink signals of this Chinese satellite. Its linear transponder is no longer functional, but its beacon is great fun to experiment with for reception of amateur radio satellites. Examples include testing and comparing different types of antennas. 70 cm CW beacon. Maximum elevation: 49 degrees

11:04 – 11:24 Hands-on session FO-29
Listening to, and maybe make a QSO via, the linear transponder of this satellite. A very distant satellite for portable equipment, but with a little bit of effort and luck we should be able to hear our own signals back on downlink. 2m/70cm SSB transponder. Maximum elevation: 73 degrees.

11:30 – 11:35 Welcome Amateur Radio Satellite User Day
Opening of the very first Amateur Radio Satellite User Day in The Netherlands.

11:35 – 12:15 FUNcube-1 – A new satellite revealed (Wouter Weggelaar – PA3WEG)
A presentation by one of the builders, about the technology used in FUNcube-1, a project of a series of organizations, including AMSAT-UK. Due to the delayed launch (now planned for November) FUNcube-1 is not yet in space during the event, but very likely Wouter will bring along the functional engineering-model of FUNcube-1. A presentation you don't want to miss!

12:15 – 13:00 Amateur Radio Satellites step-by-step, for newbies and experienced operators! (Ivo Klinkert – PA1IVO and Henk Hamoen – PA3GU0)
An introduction into orbits of LEO/HEO-satellites and how to predict their passes. We will also talk about which kind of equipment is needed to transmit

via amateur radio satellites. So, a talk on TLE, AOS, LOS, TCA, Kepler and Doppler, RHCP, LHCP, PCs, Antennas, TRX, SDR and Cubesat CW beacons.

While this

session addresses the basics of satellite communications, we invite the more experienced operators to share their experiences during the presentation as well. For example which software they use, which satellites are favorite, which antennas and rotators are being used... and: which transceivers are most popular.

13:00 – 13:45 Hands-on session FUNcube-1 Engineering model

Most likely it will be possible to make in Paasloo QSO's via the transponder of the engineering-model of FUNcube-1. A fun exercise or simply a lot of fun with a satellite of which we really control when it is within reach! 2m/70cm SSB transponder.

13:00 – 14:00 OSCAR-lunch

Extended buffet lunch buffet, where the objective is to meet and great your fellow radio amateurs that share the same interest amateur radio satellites. At

the same time a demonstration of the famous FUNcube Dongle and equipment like

Arrow antennas, LVB-tracker, etc.

13:45 – 14:15 Hands-on session LO-19

Receiving the downlink signals of the satellite. Even though this satellite has gone through some rough situations up there in space, we can still hear a

very strong (continues) carrier in the 70cm band. A great opportunity to observe the Doppler-effect and to experience how large this effect is at different stages of a pass. Or: compare again the performance of the different

antennas that will be brought by visitors. 70 cm constant carrier. Maximum elevation: 59 degrees

14:15 – 15:00 Delfi-n3Xt (Jasper Bouwmeester – Program Manager TU/d)

An update on the status of the next Dutch satellite of the University of Delft

(TU/d), which will be launched in November. Also here a lot of interesting hardware will be shown, including the engineering model of the S-band transmitter, the positioning system and the VHF/UHF antennas.

15:00 – 15:15 Radio Amateurs and scientific satellites (Henk Hamoen – PA3GU0)

How radio amateurs can contribute to scientific research in satellite projects. No QSOs therefore, but rather support of science in space.

15:15 – 15:35 A portable, multi-functional satellite station (Ivo Klinkert – PA1IVO)

A presentation on a portable satellite station for radio communications using

low earth orbit (LEO) satellites, multi-mode, including S-band reception.

15:35 – 15:45 How to apply for an ARISS school contact (Bertus Hüsken – PE1KEH)

How to apply for a school contact with the International Space Station (ISS) via ARISS.

15:45 – 16:00 AMSAT-NL (Wouter Weggelaar – PA3WEG, Chairman AMSAT-NL)

How and why AMSAT-NL was founded.

16:00 – 16:15 Future of the "Amateur Radio Satellite User Day" (Ivo – PA1IVO en Henk – PA3GU0)

Evaluation and gathering of ideas for the event next year.

16:15 Closure
BBQ for those that upfront signed up.

18:23 – 18:35 Hands-on session V0-52
For those that can get enough of it! 2m/70cm SSB transponder. Maximum elevation: 30 degrees.

Much more information (for example regarding registration) is available on this website:
<http://ivok.home.xs4all.nl/other/SatDay2013.html>

See you all in Paasloo!
Ivo Klinkert – PA1IVO and Henk Hamoen – PA3GUO

[ANS thanks AMSAT-UK, for the above information]

AMSAT-DL Satellite Symposium October 5

The AMSAT-DL satellite symposium and AGM will be held in Bochum, Germany on October 5, 2013.

The AMSAT Deutschland Facebook page says “There will be certainly some exciting news!”

AMSAT-DL Symposium lecture schedule

Saturday 05.10.2013
10:15 – 10:30 Welcome
10:30 – 11:15 Stereo A / B status and Turbo Code introduction, experience report by Mario Lorenz, DL5ML0
11:15 – 11:45 Coffee break
11:45 – 12:15 Asteroid Defense by Wolfgang Wittholt, Fernuni Hagen
12:15 – 12:45 Space Generation Advisory Council (SGAC) Small Satellite Project Group (SSPG) presentation and objectives by Dennis Mattes
12:45 – 14:00 Lunch break
14:00 Current and new projects / project progress / etc then an official part of the AGM with elections.

AMSAT-DL event announcement
<https://www.facebook.com/events/397993230305940/permalink/419259888179274/>

[ANS thanks AMSAT-UK, for the above information]

AMSAT-SM compares FUNCube Dongle Pro+ and RTL SDR's

AMSAT-SM has published a comparison of the FUNCube Dongle Pro+ and the RTL TV dongle based software defined radio.

The FCD Pro+ costs about 10 times the price of the RTL TV Dongle. While the

FCD Pro+ has a far wider frequency coverage enabling reception of LF, MF and HF
are there any other differences ?

Read the AMSAT-SM comparison in Google English at
<http://tinyurl.com/FUNCubeDongle-RTL-Comparison>

The FUNCube Dongle (FCD) Software Defined Radio (SDR) was originally developed for educational outreach as part of the ground segment for the FUNCube satellite. A proportion of the sales of the FCD goes to support AMSAT-UK's FUNCube satellite.

You can join the FCDProPlus Yahoo Group by following these steps:

- Send a blank email to [fcdproplus-subscribe\(a\)yahoogroups.co.uk](mailto:fcdproplus-subscribe(a)yahoogroups.co.uk)
- Yahoo will send you an email in response, you may need to check your SPAM folder
- Click on the link in the email, this will bring up a Yahoo page in your browser
- On the Yahoo page ignore the big Join link in the middle and click on the link at the bottom of the page instead, it says: "As an alternate option, you may join the mailing list instead."
- You should then be a member of the group.

Some of the SDR decoding programs available include:

- SDR Sharp (SDR#) <http://sdrsharp.com/>
- SDR-Radio <http://www.sdr-radio.com/>
- HDSDR <http://www.hdsdr.de/>

FUNCube Dongle Pro+ LF/MF/HF/VHF/UHF Software Defined Radio Video
<http://amsat-uk.org/2012/10/03/funcube-dongle-pro-plus-sdr-video/>

FUNCube Dongle Pro+ <http://www.FUNCubeDongle.com/>

RTL TV Dongle SDR <http://www.essexham.co.uk/news/realtek-sdr-pc-dongle-for-under-20-pounds.html>

[ANS thanks AMSAT-UK, for the above information]

Australian ham radio BLUEsat satellite in the press

The Daily Advertiser newspaper reports the University of New South Wales (UNSW) undergraduate amateur radio satellite project has been given the tick of approval to have a stratospheric balloon test flight in Wagga.

The Basic Low Earth Orbit UNSW Experimental Satellite, better known as BLUEsat, will undergo a test flight in April ahead of its launch into space.

BLUEsat, a 260mm cube weighing around 13 kilograms, will carry a flight computer with transmissions to include a beacon and amateur packet radio using the AX.25 packet radio protocol in a "mode J" VHF/UHF configuration.

Once in orbit BLUEsat will be a digital amateur radio satellite, which means that voice and data files can be uploaded to it by any amateur radio operator

in the world over which the satellite passes.

Read the Daily Advertiser article – Satellite project to reach new heights
<http://www.dailyadvertiser.com.au/story/1781014/satellite-project-to-reach-new-heights/>

Australia's own BLUEsat ready for launch
<http://amsat-uk.org/2013/09/13/australias-bluesat-ready-for-launch/>

BLUEsat on Facebook <https://www.facebook.com/bluesat.unsw>

Basic Low Earth Orbit UNSW Experimental Satellite (BLUEsat) project
<http://www.bluesat.unsw.edu.au/>

[ANS thanks AMSAT-UK, for the above information]

Canadian ConSat-1 CubeSat

The Canadian ConSat-1 3U CubeSat aims to analyze radiation characteristics in the South-Atlantic Anomaly, and test technology payloads.

Canada is an Associate Member of the European Space Agency (ESA) and ConSat-1 is one of the educational CubeSats chosen for Phase 1 of the 'Fly Your Satellite!' initiative.

The 'Fly Your Satellite!' initiative builds on the success of the 'CubeSats for the Vega Maiden Flight' pilot program. This culminated in 2012 with the launch of seven student-built CubeSats on the first flight of the new ESA Vega launcher.

The South-Atlantic Anomaly is a plasma cloud 200 km from the Earth's surface, located above the east coast of South America. It appears to be constantly growing in size and a NASA report speculates that by 2240 it might cover approximately half the southern hemisphere.

http://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/20000085550_2000122978.pdf

ConSat-1 plans to look at various aspects of the plasma cloud: its temperature, its atomic and molecular composition, its density, and its volume.

The team hope to produce meaningful data which shows the ever-changing characteristics of this extra-spatial hazard.

ESA announce six CubeSats chosen for Phase 1
<http://amsat-uk.org/2013/06/26/esa-announce-six-cubesats/>

ESA 'Fly Your Satellite' Initiative
http://www.esa.int/Education/Call_for_Proposals_Fly_Your_Satellite

Wiki – South-Atlantic Anomaly
http://en.wikipedia.org/wiki/South_Atantic_Anomaly

[ANS thanks AMSAT-UK, for the above information]

ISS Ham Video launch campaign

The ARISS DATV transmitter, dubbed "Ham Video", already onboard the International Space Station, will soon be installed in the Columbus module and commissioned.

Commissioning will be done in several steps, each during a full pass of the ISS over the Matera ground station (see Bulletin 2). It is not yet known if these passes will be chosen in close succession, or if they will cover several weeks. ARISS proposes ESA to operate so called "blank" transmissions during the commissioning period. If this is accepted, it means that Ham Video will transmit permanently without camera. The camera will not be used because it is fed on batteries and servicing it would need prohibitive crew time. Transmitting recordings is part of a future project, but not available presently.

Although ground stations will receive a black image without audio, "blank" transmissions contain all information needed for the setting up and the fine tuning of the station. Moreover, collected data will be used for a performance study of the ARISS L/S-band antennas as well as for an evaluation of the global system.

For this launch campaign, ARISS addresses a call for collaboration to the amateur radio community, especially to the operators interested in space communications. Several satellite operators have shown interest.

Ham Video technical characteristics are available at www.ariss-eu.org. Suggestions and useful addresses for the setting up of a Ham Video ground station are also provided.

Among the components of a satellite ground station, the antenna system is the most expensive. High gain antennas are needed, moved by azimuth and elevation motors and driven by an appropriate computer program. For Ham Video reception, a 1.2m dish with precision tracking is recommended. A station compliant with the recommendations provided in the aforementioned reference text should be capable of 3 to 4 minutes of DATV reception during a pass of the ISS. A0-40 operators who still have an S-band dish can now use it for Ham Video.

On the other hand, interesting data can be gathered by stations with a much simpler setup. A dish with a self made helix feed could be used without motors. This antenna could be positioned in a fixed direction, determined before a pass of the ISS, pointing to the position of the ISS at closest approach, which corresponds to the maximum elevation of the space station during the pass. With the setup as described hereunder, 1 to 2 minutes of solid reception of the Ham Video signal should be possible.

Call for participation to the Ham Video launch campaign

ARISS addresses a call to amateur radio experimenters who would like to participate to the Ham Video launch campaign.

Data gathering during the initial "blank" transmissions is important and the help of volunteering operators will be most appreciated.
More details to follow.

It is to be noted that builders of the hereunder proposed "Simple Station" could later update their equipment and add tracking motors. Chained stations will be needed for ARISS Ham TV school contacts. Video and audio from the ISS will be web streamed to the schools over the Internet.

We will keep you informed of these developments. For the time being, as a starter, let us concentrate on receiving "blank" transmissions.

All Ham TV Bulletins are available at www.ariss-eu.org

[ANS thanks Gaston Bertels, ON4WF, and AMSAT-UK, for the above information]

Amateur Radio in Space: Radio Amateurs Headed to, Return From ISS

NASA astronaut Mike Hopkins, KF5LJG, and Russian cosmonauts Oleg Kotov and Sergey Ryzanskiy are scheduled to launch aboard a Soyuz spacecraft September 25 to join their Expedition 37 crewmates aboard the International Space Station. Hopkins will be the first member of the 2009 NASA astronaut class to fly into space. While he's aboard the ISS, Hopkins will install the Amateur Radio on the International Space Station (ARISS) Ham Video gear, although that is considered a low-priority assignment.

Hopkins will join Expedition 37 Commander Fyodor Yurchikhin, RN3FI, and Flight Engineers Karen Nyberg, and Luca Parmitano, KF5KDP. Yurchikhin, Nyberg, and Parmitano arrived in May and will return to Earth in November.

Meanwhile, US Astronaut Chris Cassidy, KF5KDR, and Russian Cosmonaut and Expedition 36 Commander Pavel Vinogradov, RV3BS, came safely back to Earth from the ISS September 11 aboard a Soyuz capsule. Cosmonaut and Flight Engineer Alexander Misurkin rounded out the trio that landed in Kazakhstan after 166 days in space.

A day earlier, Vinogradov handed over command of the ISS to another radio amateur, Cosmonaut and Flight Engineer Fyodor Yurchikhin, RN3FI, in a traditional change-of-command ceremony in the Zvezda service module.

[ANS thanks the September 19, 2013 ARRL Letter for the above link]

ARISS News

An International Space Station school contact has been planned with participants at Sarnelli De Donato Middle School, Polignano a Mare, Bari, Italy on 21 Sept. The event is scheduled to begin at approximately 10:03 UTC. The duration of the contact is approximately 9 minutes and 30 seconds. The contact will be a telebridge between NA1SS and W6SRJ. The contact should be audible over the west coast and adjacent areas of the U.S. Interested parties are invited to listen in on the 145.80 MHz downlink. The contact is expected to be conducted in Italian.

"Sarnelli De Donato" School is a middle school. It serves the educational needs of the town because it is the only middle school in town. It caters for boys and girls, aged 11-14. Located in one of the region's tourist areas, it is in the suburbs of the pleasant town of Polignano a Mare, in the south-east of the APULIA region, south-east of Italy. In its Curriculum the school focus on: Space Communication, Media Communication, the Environment, Science activities in lab. The school has a gym, an auditorium, a music room, two computer rooms, a new scientific laboratory, a video room, 22 classrooms. At present there are 526 students on roll and they attend the regular class daily, from 8.00 am to 1.00 pm.

Participants will ask as many of the following questions (translated) as time allows:

1. What sensation do you standing there in the void thinking that everything around is infinite?
2. How do they appear from the space station celestial bodies: sun, planets, moon, stars?
3. The astronauts on the Space Station as they do not understand if it is night or day on Earth?
4. A drop of water that is lost in the air is dangerous for the electronic equipment on board?
5. What are the immediate benefits for humanity arising from the results of the experiments of your space missions?
6. The Risk factor aboard the Space Station can change by virtue of the

activities that you carry?

7. In a simple way how can be explained the force that keeps the ISS in orbit?

8. The infinity of space that surrounds you bring you closer to the image of

a "Creator God"?

9. The extraordinary figure of astrophysics Margherita Hack has influenced your training program as an astronaut?

10. How do you live the danger that a meteorite will collide with the International Space Station?

11. Assuming the distant future of man in space, the absence of gravity will

evolve as the appearance of man?

12. What factors determine the residence time of 6 months on the Space Station?

13. Assuming that the trajectory of a meteor crosses the Earth's orbit, what

contribution can the Space Station for safety on Earth?

14. From space failed to observe atmospheric phenomena and to provide those disasters such as tornadoes or tsunamis?

15. If the man in the distant future "inhabit" the space as it will change your perception of spatial and temporal distances?

16. This mission how is for you example of an expression of brotherhood and cooperation among people of different countries?

17. An 'possible for you direct contact with the family over the internet?

18. How much you exercise in Star City before you leave?

19. What specific astronomical events you witnessed during your stay on the ISS?

20. Will it be possible in the future for a person who is not an astronaut traveling to visit and remain on the ISS?

PLEASE CHECK THE FOLLOWING FOR MORE INFORMATION ON ARISS UPDATES:

Sign up for the SAREX maillist at

<http://www.amsat.org/mailman/listinfo/sarex>

Visit ARISS on Facebook. We can be found at Amateur Radio on the International Space Station (ARISS).

To receive our Twitter updates, follow @ARISS_status

Next planned event(s):

1. Scuola Media Statale "Salvo D'Acquisto", Cesano Maderno, Italy,
telebridge via VK5ZAI, Tue, 24Sept2013, 10:18 UTC
Watch for possible last minute cancellation.
2. College de la Combraille, La Mouniaude Chatelguyon, France,
telebridge via VK5ZAI, Sat, 28Sept2013, 08:39 UTC

ARISS is an international educational outreach program partnering the participating space agencies, NASA, Russian Space Agency, ESA, CNES, JAXA, and CSA, with the AMSAT and IARU organizations from participating countries.

ARISS offers an opportunity for students to experience the excitement of Amateur Radio by talking directly with crewmembers on-board the International Space Station. Teachers, parents and communities see, first hand, how Amateur Radio and crewmembers on ISS can energize youngsters' interest in science, technology, and learning. Further information on the ARISS program is available on the website <http://www.ariss.org/> (graciously hosted by the Radio Amateurs of Canada).

[ANS thanks David, AA4KN for the above information]

Satellite Shorts From All Over

NASA/AMSAT Mentors Still Making News

Pat Kilroy N8PK, the group's mentor, is an AMSAT area coordinator for Maryland/Washington DC. See:

http://www.southgatearc.org/news/september2013/nasa_interns_start_work_on_future_cubesat_mission.htm#.UjmW6X90sw8

Or

<http://phys.org/news/2013-09-nasa-interns-future-cubesat-mission.html>

[ANS thanks Southgate ARC, for the above information]

Space Weather's Effects on Satellites

MIT Study of interest to the satellite community:
<http://web.mit.edu/press/2013/space-weather-effects-on-satellites.html>

[ANS thanks Les Rayburn, N1LF, and Spacedaily.com for the above information]

/EX

In addition to regular membership, AMSAT offers membership in the President's Club. Members of the President's Club, as sustaining donors to AMSAT Project Funds, will be eligible to receive additional benefits. Application forms are available from the AMSAT Office.

Primary and secondary school students are eligible for membership at one-half the standard yearly rate. Post-secondary school students enrolled in at least half time status shall be eligible for the student rate for a maximum of 6 post-secondary years in this status. Contact Martha at the AMSAT Office for additional student membership information.

73,
This week's ANS Editor,
Joe Spier, K6WAO
k6wao at amsat dot org